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Combat Crew

strategic air command

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SEPTEMBER 1976

Combat Crew

strategic air command

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ON OUR COVER

(Left to right) Major Charles "Fred" Black, SAC Test OSO and Major Peter E. Sfameni, SAC Test DSO, 4200 Test and Evaluation Squadron, Edwards AFB, review details of a B-1 flight test profile. For more details see page 4.

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HISTORY

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OUR ALLY IN READINESS

In the military, history sometimes is our greatest ally. By looking back on the mistakes of military and civilian leaders of the past, hopefully we can avoid future tragedies. One very important Trojan Horse of our past was the surprise attack on Pearl Harbor on December 7, 1941. The Japanese planes met limited opposition. While their fighters and bombers attacked the airfields at Wheeler, Hickam, Kaneohe, Bellows and Ewa, torpedo and horizontal bombers concentrated on Pearl Harbor. Surprise was complete. We were not by any means in the proper state of readiness. In less than two hours, the winged raiders were gone and the ships of the Japanese striking force were withdrawing into the northwest. The savage assault had taken a serious toll — 7 of the 8 U.S. battleships had either been sunk or badly crippled; 3 cruisers had suffered severe damage, as had 3 destroyers. Of a total 394 U.S. planes, 188 were demolished; 159 damaged; 2403 Americans were killed; and 1178 wounded. The Japanese lost 29 aircraft, 5 midget submarines, and 1 full-sized submarine. Our lack of readiness resulted in a substantial set back. U.S. naval and air power in the Pacific were practically destroyed as a result of the attack.

All of this happened while the U.S. and Japan were trying to settle their differences at the conference table. In our hopes to reach a peaceful settlement, we made the fatal mistake of letting our guard down. We can ill afford another Pearl Harbor. Fatalities would be in the millions and the amount of damage and destruction would be colossal. It is vitally important that we maintain a constant state of readiness regardless of our expectations at the conference table.

What is this state of readiness and to whom does it apply? It starts with you, the missile or flight crewmember and goes right up the chain of command to the President. Each crewmember must know his tech data and be mentally and physically prepared to carry out his assigned mission as a SAC crewmember. As a professional, he should be doing everything within his power to insure he gets the most out of every training sortie or practice launch. The stakes are too high to make a half-hearted effort. Our country deserves your best.

In the event of another surprise attack, there will be no time to train. The response will be needed within minutes — not days or weeks. As evident in Linebacker II operation during the Vietnam conflict, the SAC crewmember never failed the nation in a time of crisis and I am sure he never will. The crewmember is the bread and butter of SAC, but if he does not have the proper attitude, all the B-1s, all the advanced tanker-/cargo aircraft or the M-X missiles in the world cannot save us.

Let us not betray our ally — History. Recent history in the form of Pearl Harbor has told us that readiness is a necessity. Our country needs the proper response by all of us. Our security hinges very much on the perception the world has of our ability to perform the SAC mission. Alexis de Torqueville put the bomb right on target when he stated, "War is an occurrence to which all nations are subject, democratic nations as well as others. Whatever taste they may have for peace, they must hold themselves in readiness to repel aggression."

Major General Thomas F. Rew
Commander, Third Air Division

U.S. AIR FORCE

B-1 A VIEW FROM THE AFT STATION

Maj Gen Richard N. Cody
HQ SAC Deputy Chief of Staff, Plans

There has been a great deal written about the B-1 lately but most of the material has tended to focus on flying characteristics and performance, and most of that from a pilot's point of view. In this article I would like to concentrate on the back end — the business end, if you will — of the B-1 to give you SAC crewmembers, especially the navigators and electronic warfare officers who will one day be flying in the back end of the airplane, a better understanding of how we have configured the offensive and defensive avionics and how those systems will be employed.

The B-1 avionics systems will be operated by only two crewmembers — an Offensive Systems Operator (OSO) and a Defensive Systems Operator (DSO), who must be capable of performing their duties as efficiently as possible in a high task load environment. They are obviously going to be busy, responsible crewmembers. Consequently, there should be no room for error in the design of the system architecture or the controls and displays which would add extra tasking to their jobs. Equipment placement must provide for proper viewing angles, controls functionally grouped and switches within reach during critical phases of flight such as missile launch and bomb runs. In brief, the overall cockpit design must fit the needs of the operators and the tasks to be performed.

With these objectives in mind, the Boeing Company, in April 1972, was selected as the associate contractor for the integration of the avionics systems, both offensive and defensive. Using guidelines that directed the maximum use of modern off-the-shelf equipment, the Boeing Company assembled the B-1 offensive avionics suite which was designated the AN/ASQ-156. This equipment configuration was subjected to exhaustive studies and testing to assure the utmost in capability, reliability and commonality with other Air Force systems and consists of the

Maj Black at his crew station in B-1 aircraft 3.

following: an APQ-144 forward looking attack radar, used in the F-111F and modified for B-1 use (±60° scan); APQ-146 terrain following radar also used in the F-111F; a forward looking infrared (FLIR) sensor, which is a modification of the system used on the B-52 G/H; the APN-200 solid state Doppler radar; redundant inertial measurement units currently being used with the B-52 SRAM system; and redundant radar altimeters.

The interface for this complex array of avionics and the operator is provided by the controls and displays. The most significant offensive controls and displays include three cathode ray tubes for alphanumeric display of weapon status and navigation information; a multifunction display for the Forward Looking Infrared; a forward-looking cathode ray tube for the attack radar; a data entry unit which enables insertion of the flight program; and a keyboard which allows the operator to enter data into the Avionics Control Unit Complex (ACUC) or interrogate it for flight program status.

The controls and displays for the OSO allow monitoring and control of the weapons in the B-1's three weapons bays. Each bay is capable of carrying eight Short Range Attack Missiles (SRAM) or a combination of SRAM and gravity nuclear weapons. The OSO has the option of selecting preprogrammed automatic weapon delivery or any combination of automatic and manual weapon delivery needed to fit target requirements.

The target requirements are contained on the B-1 flight mission tape, which is loaded into the ACUC via a cassette. This tape will include such items as targets, offsets, mission check points, SRAM launch points, radar order of battle, ECM parameters and weapon data. The cassette is loaded by the OSO who inserts it into the data entry unit in the aft station and is fed directly into the computers. The computers provide information to the autopilot which automatically steers the B-1 from point to point along its route, from takeoff to landing. In the event another route is desired, the operator can insert a new cassette, or change the mission manually using the integrated keyboard.

Attuned to the offensive avionics are the defensive systems where determination was made in 1973 that a completely new development was in order to apply state-of-the-art technologies against the projected increased enemy threat. The defensive system contract was awarded to AIL, a Division of Cutler Hammer, on 8 Jan 74.

The defensive requirements will be met by three elements: an Expendables Countermeasure System, a Tail Warning System and the Electronic Countermeasures (ECM) System. The ECM system, the main element, is designed to operate primarily in the automatic mode; however, the operator can intervene at his discretion for update or modification purposes. The latest advances in ECM technology are used to provide flexibility in accommodating the projected threat environment of the future. This flexibility is provided by the software programs resident in the defensive

(From left) Maj Black and Maj Sfameni review mission details.

computers. When new or changed radar parameters are discovered, they can be programmed into the software along with an effective countermeasures technique which will allow the equipment to recognize and counter the threat.

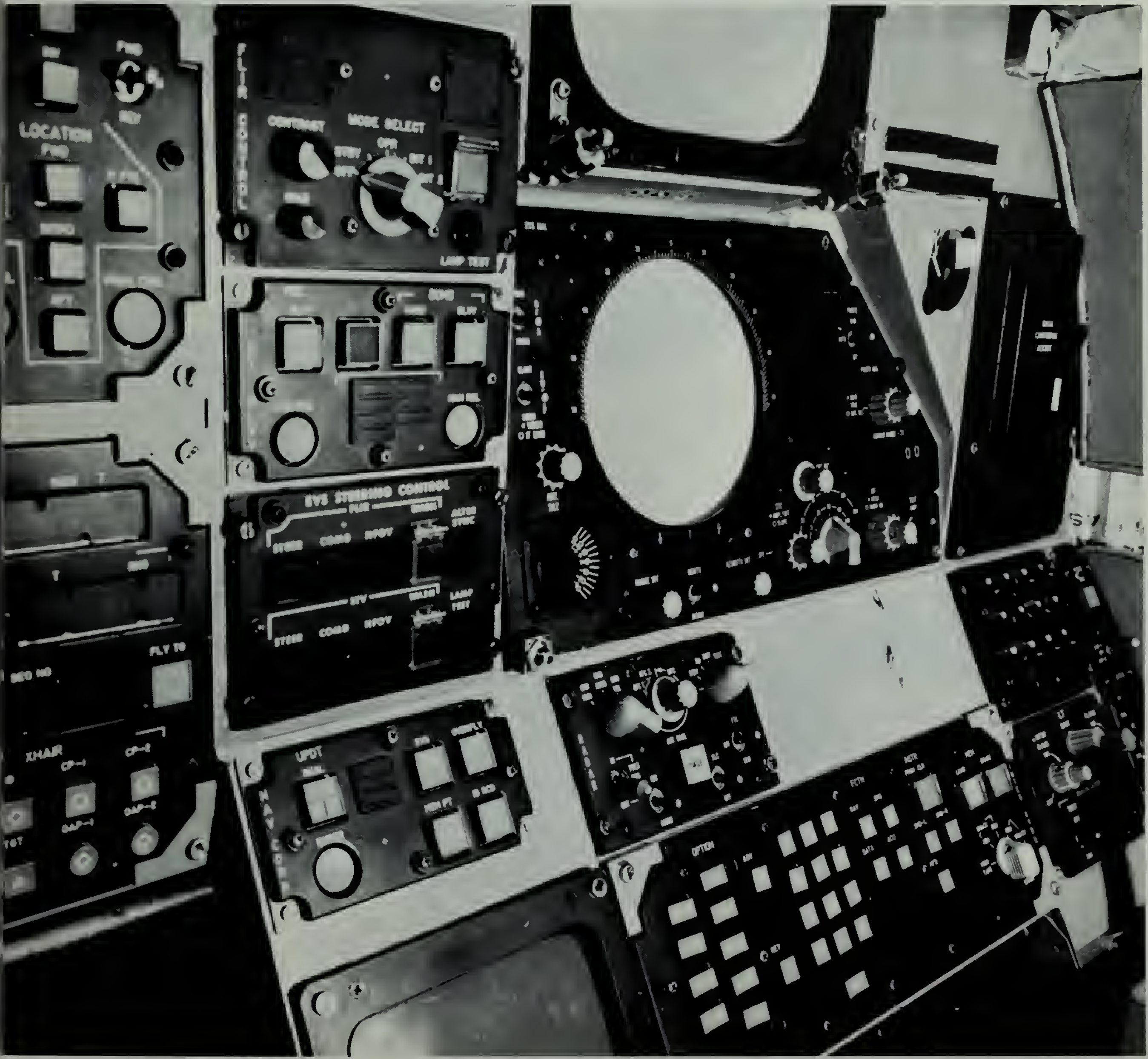
The Tail Warning and Expendable systems will interface with each other for optimum performance. Chaff and/or flare dispensing can be programmed to occur automatically according to inputs from the Tail Warning System, or manual dispensing can be accomplished. This interface is provided through hardware/software integration within the ACUC.

There are two primary displays which present required data to the DSO. One display, called the Threat Situation Format (TSF), will allow the operator to compare the detected environment to an electronically generated defensive order of battle (DOB), displayed in a map-like format, and will also display the aircraft in relation to pre-planned track and turn points. The other display, termed the Panoramic Format (PF), will display relative signal strength and frequency of the detected environment.

To expand on the heart of the Avionics system, the ACUC, there are three interchangeable Singer-Kearfott general purpose computers, two for the offensive system and one for the defensive, supported by an IBM Mass Storage Unit (MSU). The ACUC is a control system that

Continued on Page 21

A view of the Offensive Systems Operator panel layout in B-1 aircraft 3.



TO SEE OR NOT TO SEE

VISUAL ACUITY OF PILOTS INVOLVED IN MIDAIR COLLISIONS

A summary of an FAA study prepared for the Department of Transportation by Leonard C. Ryan, S. J. Gerathewol, Stanley R. Mohler and Charles F. Booze, Jr.

Midair collisions — an area of great concern in aviation safety — are unlike other types of aircraft accidents in that in almost 50% of all cases, there is at least one death.

Various methods and techniques have been tried and some are presently in use to enable the pilot to avoid the potential midair collision. Various studies have been performed on visual collision avoidance techniques. New and different lighting systems have been tested. The Federal Aviation Administration, Department of Transportation, adopted new rules requiring all powered U.S. civil aircraft with a standard airworthiness certificate to be equipped with approved anticollision lights for night operations after August 11, 1972, as an aid in preventing midair collisions. With the sky becoming more and more crowded and aircraft flying at higher speeds, it is conceivable that the problem of preventing midair collisions will be worse in the future. The most often probable cause of the midair collision cited by the National Transportation Safety Board is "pilot in command failed to see and avoid other aircraft." From the above, one can begin to realize the importance of vision in avoiding a collision in the see-and-be-seen system.

In order to answer the question of whether there is a correlation between visual acuity and midair collision, all available medical records of U.S. civil pilots involved in fatal midair collisions from 1970 through 1973 were reviewed and analyzed as to visual functions, impairments and corrections as to visual acuity. This first group was then compared with two other groups of pilots: pilots who had no aircraft accidents, and pilots involved in other types of aircraft accidents.

Since we were unable to study all of the pilots involved in other types of accidents and all of the pilots who had no aircraft accidents, it was desirous to select representative samples from these two groups. For this reason, random samples were

selected using systematic sampling techniques. If the airman's medical record stated that he needed glasses for near, distant, or near and distant vision, the pilot was placed in the visual correction group. No consideration was given to the degree of visual impairment.

Results

There were 118 midair collisions from 1970 through 1973. At least one fatality occurred in 66 of these accidents. There were 221 fatalities in all and 28 serious injuries.

Midair collisions occurred generally during daylight hours. Fifty-six percent of the accidents occurred in the afternoon, 32% in the morning, with the remaining 12% occurring at night, dusk and dawn. Most occurred in weather conditions when the visibility was acceptable; i.e. three miles or more.

The midair collisions occurred generally throughout the year for this four-year period with the exception of March, April and May. Only 8% of the accidents occurred during this three-month period.

As expected, in all three groups the non-accident, the accident and pilots involved in midair collisions, most visual corrections occurred in pilots 40 years of age or more. However, 62% of the pilots involved in midair collisions had no visual corrections. Fifty-four percent of the nonaccident pilots had no visual corrections as did 51% of the pilots involved in other types of accidents. From this, it appears that visual corrections were not a factor in the midair accidents. In fact, it appears that the pilots involved in midair collisions had fewer visual corrections than the other two groups.

The recency of flight experience was also examined.

When the midair accident group was compared with the nonaccident group, the midair group had flown significantly more. There was no significant difference in total flight time between the three groups.

Since it appears that visual corrections had no effect on midair collisions and the pilots involved had flown more in the last six months than the nonaccident pilots, the question arose as to pilot fatigue contributing to the midair accidents. To try to get some indication as to whether this was the case, the amount of flight time on the flight that the accident occurred was reviewed. The average flight time prior to the collision was 45 minutes. However, this varied from takeoff to over seven hours. Sixty percent of these pilots on the fateful flight had been airborne 30 minutes or less. In fact 33% had been up only 10 minutes or less. Eighty percent had been up one hour or less. Only 6% had been flying longer than two hours.

From these results, it would appear that fatigue was not a major factor in the collisions, at least fatigue from the flights that the accidents occurred. However, this does not eliminate the possibility of the pilot being fatigued prior to takeoff.

Summary

Records of airmen involved in fatal midair collisions from 1970 through 1973 were examined and compared with two other groups of pilots: pilots involved in other types of accidents, and pilots without any accident records. There is nothing in the results to indicate that the pilots with visual corrections are a greater risk. In fact, the pilots involved in midair collisions as a group were better off visually.

The analysis of the pilot's flight time for the last six months, showed that pilots involved in midair accidents had flown the greater number of hours than the pilots in the nonaccident group. There was no significant difference in other accident pilot group.

There was no significant difference in total flight time in the three groups.

It can be concluded from the results of this study that visual impairment if corrected in accordance with our present medical standards, docs not constitute a midair collision risk for U.S. civil aviation pilots.

A THREE-LETTER WORD

Captain Douglas O. Burmeister
911AREFS, Seymour Johnson AFB

I *assumed* that he . . . How many times is the word *assumed* used each day? If we eliminated the action or non-action associated with this word, a tremendous amount of time and money could be saved. Regrettably people assume and that fact has an impact on the safety of SAC operations. It also has an impact on every other part of our society.

The luxury of several crewmembers within the cockpit has been a safety feature of most SAC aircraft weapon systems. However, not all the crews utilize the advantage of the multiman crew. An inexperienced crew, for example, may tend to work as individuals simply because each member is educating himself in his own specialty. Not until he gains confidence in himself and a base of experience will a crewmember pay particular attention to the functions of other crewmembers an arms reach away. This results in the tendency for the inexperienced crewmember to assume. He may assume the pilot, copilot or navigator understands what is being accomplished, what has to be accomplished and that the task is being done correctly.

As a crew continues to fly together and mold itself into a well coordinated team, another similar tendency may surface. Individual crewmembers may be lulled into a false sense of security because each mission resembles the previous. Because of this false sense of security the crewmember may assume the aircraft flies on a string and never deviates from the norm. This is where the landing gear can be forgotten because of the previous three engine missed approach. Of course, not all crewmembers would be lulled into this type of complacency.

The experienced crew becomes a finely honed machine but suddenly one member is replaced by an inexperienced individual. The new crewmember's tendency may be to assume that what is transpiring is correct. He therefore relies upon the others' experience and sometimes he fears to contradict or question. Assumption in-flight could be fatal not only to the individual but to the other crewmembers and passengers that are aboard.

The crew chief that doesn't properly fasten a panel, or maybe uses a key or knife rather than the proper tool, assumes he will tighten it later. The result could be another panel lost endangering life and property.

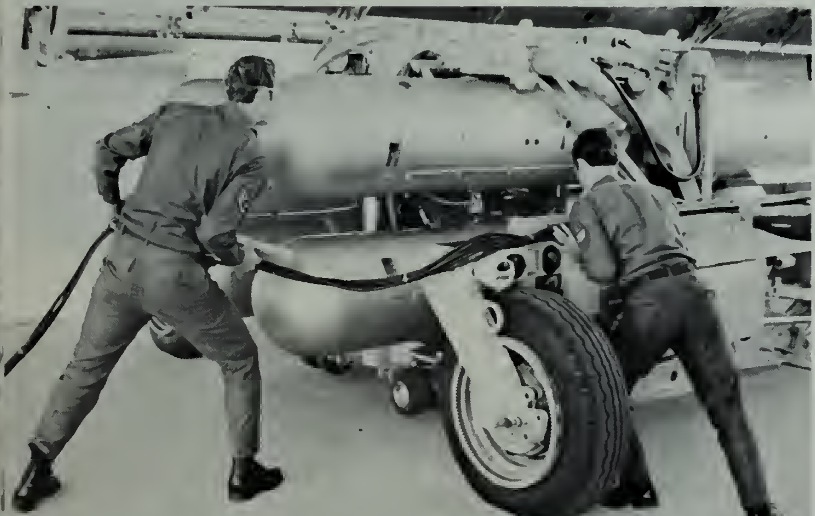
Have you ever assumed that scheduling will take care of your 60-1 yearly requirements? No need to worry about that sort of thing when you have all those men doing their jobs. Well, let's hope that scheduling doesn't assume you will remind them of your needs.

In the final analysis, assumption tends to lead toward a not so perfect conclusion. The paragraphs above simply exemplify the many and varied situations which could lead to trouble. As each aircraft commander knows, he is responsible for his crew's actions or inaction. Hence, the aircraft commander must strive to eliminate assumption and replace it with fact and knowledge. When he achieves that goal, he no longer will stand in front of the commander explaining his assumptions.

Don't let assumption make a three-letter word of you.

GIANT SWORD '76

Scenes from the 1975 Giant Sword Competition.



The first SAC Munitions Loading Competition was held at MacDill AFB in March 1958 with the 29th Aviation Depot Squadron from Homestead AFB taking top honors. A second competition, hosted by March AFB was held in October 1958. From there, the competition moved to Bergstrom AFB for the next two years.

With the advent of the war in Southeast Asia, the competition was suspended for 13 years. During those 13 years, SAC munitions personnel proved their professionalism and capabilities by supporting the Southeast Asia effort, while at the same time maintaining SAC's primary mission of strategic deterrence.

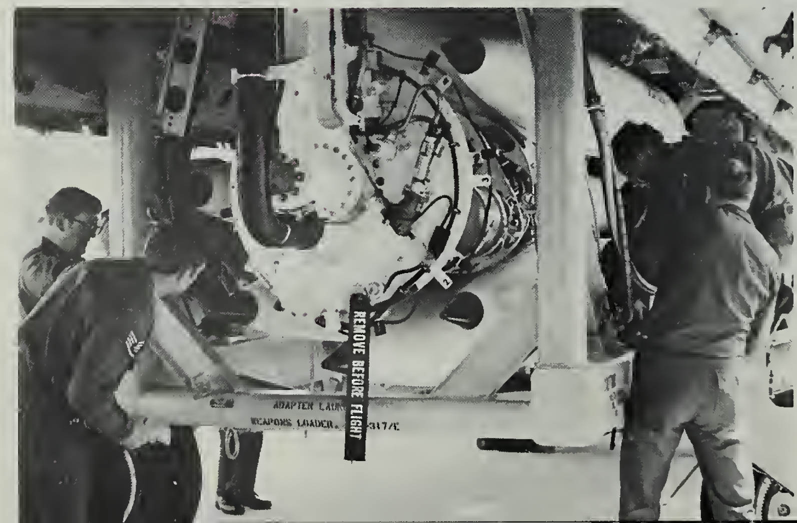
The Munitions Loading Competition was reborn in 1974 with the renewal of the Bombing and Navigation Competition at Barksdale AFB and was held concurrently at Blytheville AFB. Aircraft crew chiefs were included as integral members of the munitions load crews. The 93d MMS from Castle AFB won the "Best in SAC" trophy at the 1974 meet.

Last year's competition at Ellsworth AFB was expanded to include an aircraft security police element. With the addition of security procedures to the competition, the day-to-day munitions loading team effort is accurately demonstrated. SAC's Giant Sword is teamwork, not weapons. We are meeting again to have the edge of that sword honed and determine who is the "Best in SAC."

Last year, Castle's 93d Bomb Wing retained its title as the best munitions unit in the Strategic Air Command. For their success, the 93d was awarded, and still retains the "Best in SAC" trophy. This year, all participating units will have a chance to gain the honor that Castle has held for the past two years.

SAC has long recognized the value of spirited competition between units. In this year's Giant Sword, munitions loading crews and security policemen from the command will be competing and also increasing the overall ability of the individual and the command to perform its primary mission.

Giant Sword '76 will be held at Ellsworth AFB on 27 Sep to 6 Oct. The overall competition objectives



will be to improve loading proficiency, security police skills and the evaluation of new concepts. Other objectives include the recognition of outstanding loading crews, aircraft crew chiefs, and security policemen, enhancement of esprit de corps, and promotion of competitive spirit among units.

The chief of the SRAM division, Hq SAC, Lt Col John W. Haley III, will be the 1976 Giant Sword Munitions Loading Competition commander. The Giant Sword deputy commander for security police matters is Lt Col Charles H. Bailey. The Hq SAC security police project officer for the competition is Maj Burch H. McDonald.

Each bomb wing, including the 43d Strategic Wing, will be represented by a wing competition team comprised of a five-man munitions load crew, an aircraft crew chief, a six-man security police element and a team OIC and NCOIC. Each load crew will be required to load two different loads, one of the standard nuclear capability and the other of either SRAM or conventional munitions according to the type and model of each parent wing's aircraft. The 93BMW has been assigned variations in the required loads.

Loading Crew Scoring. Each loading crew will be evaluated on their loading equipment, a written test, and two loadings by the evaluation/scoring committee. Point values will be used to determine the loading crew's score for each evaluation.

Security Police Scoring. Point values will be used in determining the scores for each security police element. The total number of points possible for each team is 500. The 500 points will be divided among the three phases of the security police competition as follows: Practical Exercise — 200; Written Testing — 150; Weapons Firing — 150. Actual number of points awarded is dependent upon team performance in each of the three phases of the security police competition.

AWARDS

Best Munitions Competition Team in SAC. This trophy is awarded to the wing whose competition team compiled the highest overall score. The winning wing will retain the trophy for one year. A plaque will be awarded for permanent retention by the wing. Each member of the winning team will receive a chalice, certificate and winner's patch for permanent retention.

Best Munitions Load Crew in SAC. This award goes to the winning munitions maintenance squadron to serve as recognition of the outstanding achievements of its load crew. The winning wing will also retain this trophy for one year. A plaque will be awarded for permanent retention by the unit. Each member of the MMS load crew and the OMS crew chief will be awarded a chalice, certificate and winner's patch for permanent retention.

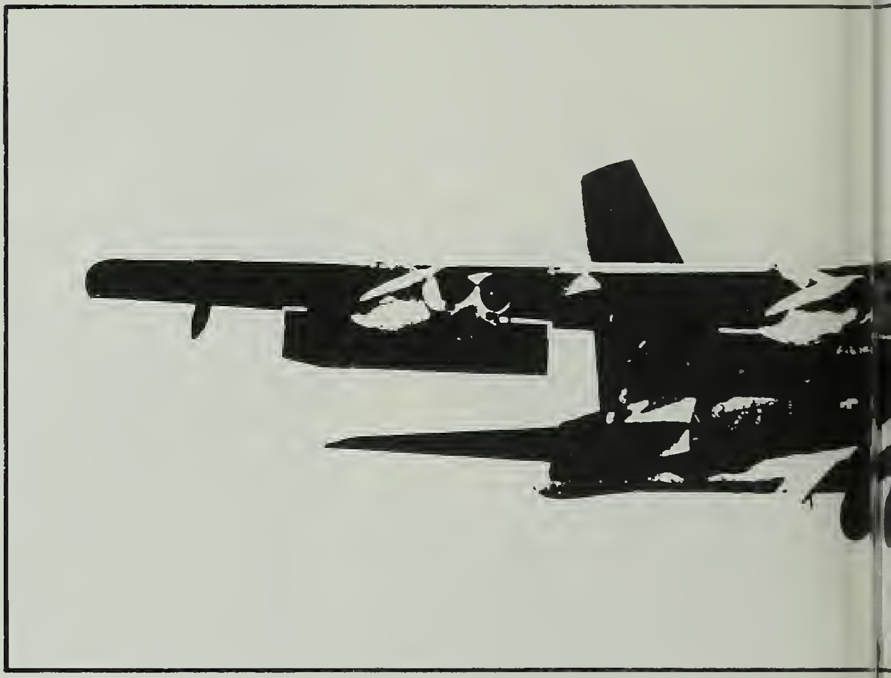
Giant Sword Best Security Police Unit. The security police trophy is awarded to the winning security police squadron to serve as a testimonial to the outstanding achievements of its security police team. The trophy will be retained for one year. A plaque will be awarded for permanent retention by the unit. Each member of the security police team will also receive a chalice, certificate and a winner's patch for permanent retention.

A plaque will be awarded to the load crew that scores the highest total points for two loads, to the security police element having the highest score in the practical exercise, and to the best aircraft crew chief. Plaques are to be retained permanently by units. Suitable awards will be awarded to each member of the winning team in each category.

Giant Sword '76 will be a keenly competitive event. Each year there has been an increase in the proficiency and knowledge displayed at the loading competition. This year will be no different. Good luck to all participants — the competition is going to be tough.

WHERE AWARENESS PLUS TEAM WORK EQUAL FLYING SA

B-52 IN-FLIGH



Captain Stephen R. Schmidt
2BMW, March AFB

During a B-52 in-flight emergency, aircrew discipline and proper coordination with the command post is essential in order to safely terminate the mission. Such was the case a few months ago, after a B-52D from March started its takeoff run. The 70 knot call was made and at S^1 time the S^1 speed requirement was met. The pilot announced, "Committed," and continued what appeared to be a normal takeoff. Just prior to liftoff, the radar navigator who was monitoring the takeoff through his optics, noticed heavy smoke coming from the right forward gear. Realizing that the takeoff was committed, he wisely chose to wait until the aircraft was safely airborne before discussing the problem with the pilots.

Minutes later, the tower called and informed the crew that the maintenance flight chief was observing the takeoff and noticed a large amount of smoke coming from the main gear just prior to liftoff. Due to the professionalism and conscientiousness of the radar navigator and the maintenance flight chief, the pilot was made aware of a possible serious in-flight emergency.

In order to cool the overheated tires, the gear was temporarily left in the down position. After sufficient cooling, the aircraft commander raised the gear and descended to 10,000 feet, depressurized, and directed the gunner to crawl forward and visually inspect the rear gear. The instructor radar navigator volunteered to crawl into the forward wheel well to check the forward gear. The gunner reported the aft gear were in good condition and returned to his aft compartment. The instructor radar navigator reported that right gear tire damage was visible.

The pilots quickly passed all available information to the 22d Bomb Wing Command Post. To determine the severity of the problem and insure that proper procedures

TY . . .

T EMERGENCY

were followed, the command post made contact with the Boeing Company in order to receive further technical assistance.

The problem was discussed in detail and a Boeing official suggested that a landing with the malfunctioning right forward gear down could result in possible tire explosion, fire, and severe aircraft damage. Therefore, he recommended a landing with the right forward gear retracted. The wing commander, Col Stanford E. Brown, and his staff concurred and elected to have the pilots land with minimum fuel and the right forward gear retracted. The light gross weight would help reduce the strain on the extended left forward gear.

With the pilot and the instructor pilot at the controls, a precision approach was planned for a full stop landing. Fire department trucks had already responded to the emergency and were positioned near the runway. The IP made a smooth landing and the drag chute was deployed. The aircraft leaned considerably to the right because of the retracted gear; however, steering was not a problem during landing roll. The aircraft came to a stop on centerline 1000′ from the end of the runway.

Maintenance crews arrived quickly to check the aircraft and to prepare it for towing off the active runway. The maintenance chief later disclosed that they found a malfunctioning anti-skid control switch on the right forward gear. No other damage to the aircraft was discovered.

Thanks to an outstanding professional team effort by members of the 22BMW, a serious in-flight emergency was quickly and correctly analyzed. By using the proper tech data procedures and all available resources to determine the best course of action, the crew was able to prevent personal injury and safely recover a valuable SAC aircraft.

BIG INSTRUMENT

VISIBILITY — TO LAND OR NOT TO LAND PART II

THE RUNWAY ENVIRONMENT

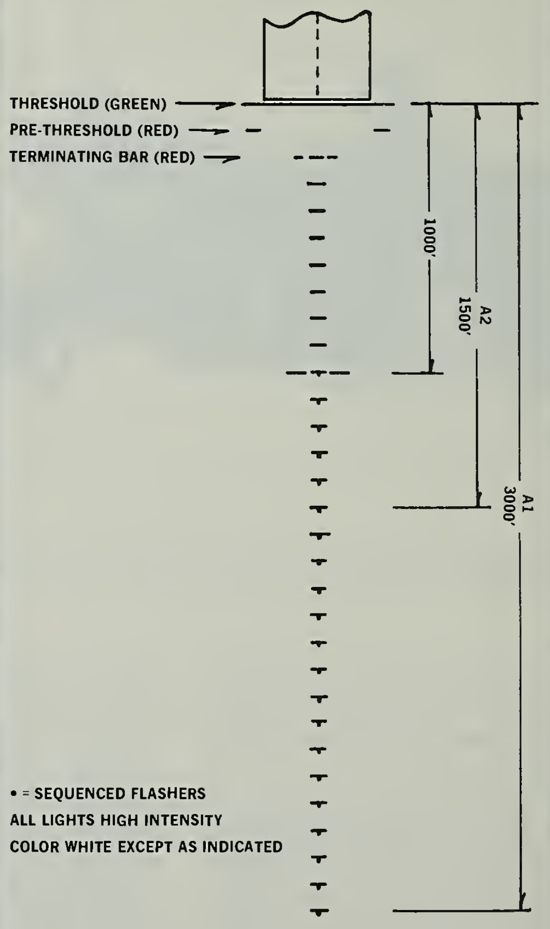
Captain John L. Wilson
1st Combat Evaluation Group
Barksdale AFB

During an instrument approach in actual weather conditions, the first useful information you will observe about the runway environment will be the approach lights followed by the VASI, runway lights, and runway markings. To safely complete a landing under low visibility conditions, it is necessary to understand the arrangement of these landing aids and what they can tell you about your position in relation to the runway.

There are numerous different lighting systems in use throughout the world. This article will not cover them all, but will discuss the basic types you will find at most SAC bases. Other configurations are shown, as required, on the inside back cover of the High and Low Altitude Instrument Approach Procedures books. You should refer to this legend any time you review an approach. You should also review any lighting notes on the airfield diagram as important information on the lighting system is often included. Another source to consult when checking on lighting systems is the Enroute Supplement. This source contains additional information not apparent on the airfield diagram and will include notes on nonstandard lighting such as VASI lights that do not correspond to the glide path, nonstandard lengths of the sequenced flashers, etc.

The "A" series of approach lights are the most common systems found in SAC and in the U.S. The "A" through "A5" systems are similar in that the basic layout is the same. They all consist of a series of light bars starting at 200 feet from the threshold along the extended centerline of the runway into the approach course. They also include additional light bars at 1000 feet from the threshold, extending out

FIGURE 1



A1 & A2 LIGHT SYSTEMS

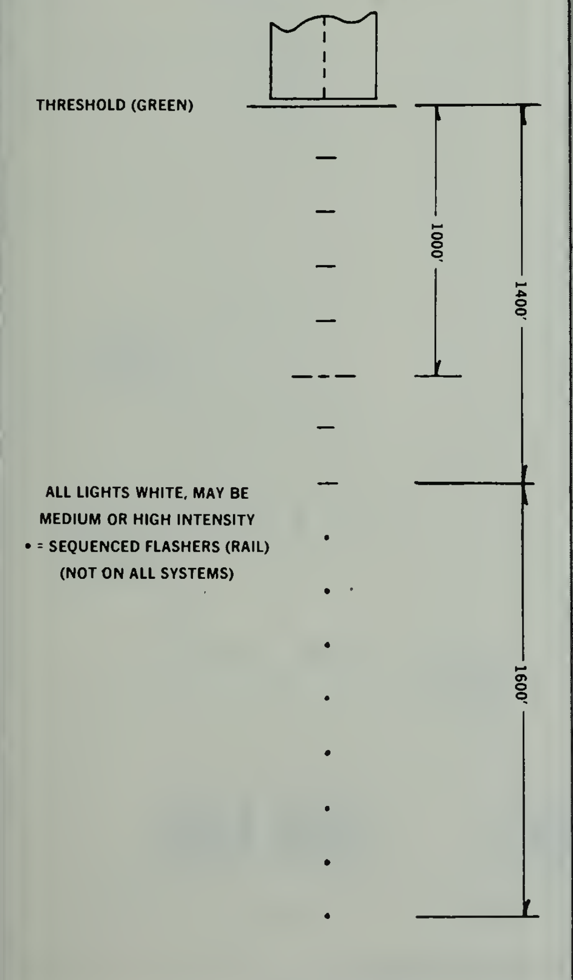
on either side of the centerline lights to provide roll guidance. They thus provide runway centerline guidance, roll guidance, and distance to threshold information. The differences include light intensity, length of the system, sequenced flashers, terminating lights and light spacing.

The "A1" system (ALSF-1) is the most commonly found system (Fig 1). This system is 3000 feet long with high white intensity lights down to 200 feet from the threshold. The system usually incorporates sequenced flashers from the 1000 foot cross bar and extending out to 3000 feet from the threshold. All light bars are placed at 100 foot intervals.

The system is terminated at 200 feet from the threshold with a red centerline bar and additional red bars to either side of this centerline bar. Note that there is no 100-foot centerline bar but instead there is a red light bar on either side of centerline called prethreshold bars.

The next most common system is the A2 or Short Approach Light System. The configuration is the same as the A1 system but is only half as long, consisting of the last 1500 feet of the A1 system (Fig 1). The sequenced flashers are, of course, only 500 feet long instead of 2000 feet long as with the A1 system.

FIGURE 2


THRESHOLD (GREEN)
1000'
1400'
ALL LIGHTS WHITE, MAY BE MEDIUM OR HIGH INTENSITY
• = SEQUENCED FLASHERS (RAIL)
(NOT ON ALL SYSTEMS)
1600'

A3, A4, A5 CONFIGURATION

The A3 system, although providing the same basic information as any of the A systems, has some major differences (Fig 2). This system, as with the A4 and A5 systems, is only 1400 feet long. The light bars are spaced every 200 feet, as compared to every 100 feet with the A through A2 systems. This system does not have the red terminating bar or the red prethreshold bars. The last bar, at 200 feet from the threshold, is white with the next lights toward the runway being the green threshold lights. If sequenced flashers (RAIL) are included with the A3 and A5 systems, they start at 3000 feet and go up to (but do not include) the first light at 1400 feet. The A4 system may include three sequenced flashers, one each with the 1400, 1200, and 1000 foot bars.

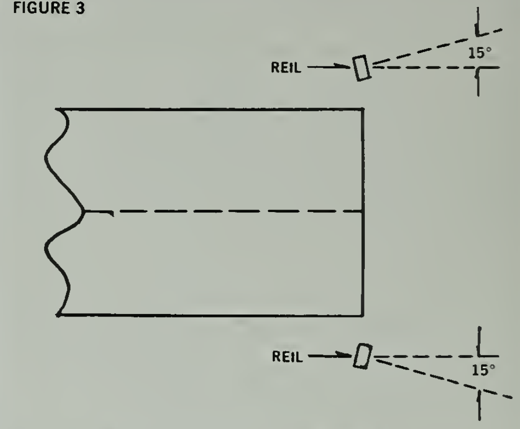
The runway threshold is marked by a row of green lights across the end of and within 10 feet of the runway. In conjunction with the A series lighting systems, these lights extend 40 feet beyond the edges of the runway. The end of the runway may also be defined by Runway End Identifier Lights (REIL). These are a pair of flasher lights located at the end of the runway, 40 feet outward from the runway edges, and aimed 15° outward from the runway heading (Fig 3). The runway itself is outlined with white high or medium intensity runway lights, spaced every 200 feet down the runway. The last 2000 feet of runway lights may be yellow instead of white to give an indication that you are approaching the end of the runway during landing roll. Runway lights which would occur on the paved section of taxiways or intersecting runways are omitted.

VASI, when installed, is an excellent aid for maintaining normal glide paths. The VASI glide path is often aligned to correspond to the ILS or PAR glide paths. A check of the IFR Supplement should be made, however, since some systems do not correspond or, due to operational requirements, will actually cause the aircraft to touchdown short of the runway. With the advent of the wide body aircraft, some bases have installed a 3-bar system. Other than wide body aircraft should fly the glide path indicated by the first two bars. In other words, you should see RED over RED over WHITE when on glide path.

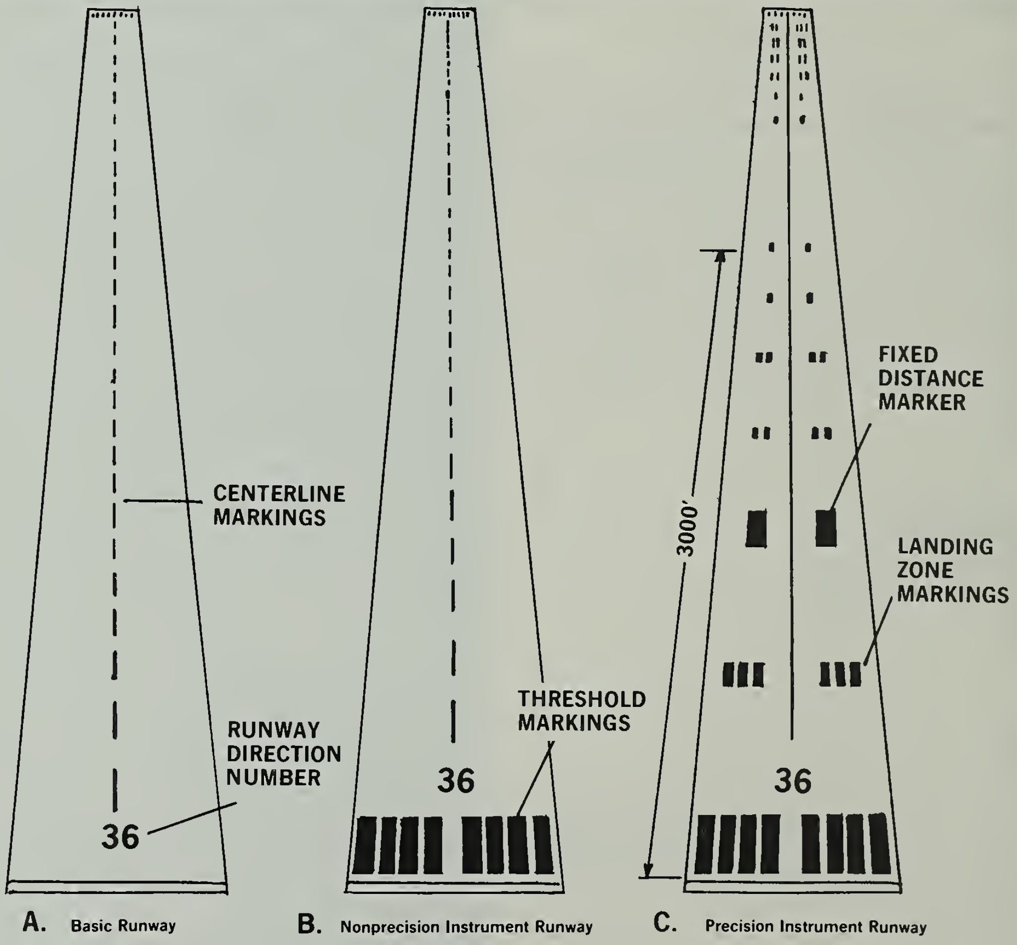
The final part of the runway environment you will see is the runway markings. There are three types of runways: the basic runway, non-precision runway and the precision runway (Fig. 4). The precision runway markings are the ones normally seen in SAC and are used on any runway to which a precision approach is available. Notice the touchdown zone markers placed every 500 feet down the runway from the threshold and the fixed distance marking at 1000 feet down the runway. These are provided to give you an idea of where you are in relation to the touchdown zones (defined in AFM 55-9 as the first 3000 feet). The fixed distance marking provides an aiming point for touchdown. When this marking is not used, it is replaced by a touchdown zone marker like the one at 500 feet.

These then are the primary types of approach lights, runway lighting, and runway marking systems you are likely to encounter in SAC. There are, however, other systems in use at military and civilian airfields that help you in identifying the runway environment and aid in making a safe landing in marginal weather conditions. There are also variations of the systems just described that will not be apparent with just a quick glance at the airfield diagram. You should make it a part of your normal approach review to look at all information available to you in the approach book, enroute supplement and via NOTAMs. This is the only way you can be assured of having sufficient information about the runway environment to complete a safe, normal landing.

FIGURE 3



RUNWAY END IDENTIFIER LIGHTS (REIL)



A. Basic Runway B. Nonprecision Instrument Runway C. Precision Instrument Runway

FIGURE 4 RUNWAY MARKINGS

B-1 AFT VIEW

Continued from Page 7

collects data from sensing devices, uses the data in conjunction with prestored information in determining navigational, weapon delivery, stores management and electronic countermeasures requirements and sends commands to implement its decision. Each offensive computer supplies current data to the other to coordinate their back-up capabilities in the event one computer fails. The offensive system computers can also assume the function of the defensive computer if it should fail.

The MSU is an independent computer memory device used for storage of redundant program instructions, redundant navigation and weapon delivery data, bomb damage assessment data, Central Integrated Test System (CITS) information and computer diagnostics. In the event a condition exists that requires reloading of either computer, this procedure can be performed utilizing the MSU.

The B-1 is designed to meet the navigation and bombing criteria developed specifically with SAC's future requirements in mind. These requirements stress accuracy, reliability and penetrativity. During the testing of the first offensive equipped aircraft, which began 2 Apr 76, the B-1 avionics system has met or exceeded the Air Force's expectations and test objectives to date. The defensive system has successfully passed all major design reviews and will be flight tested on aircraft 4.

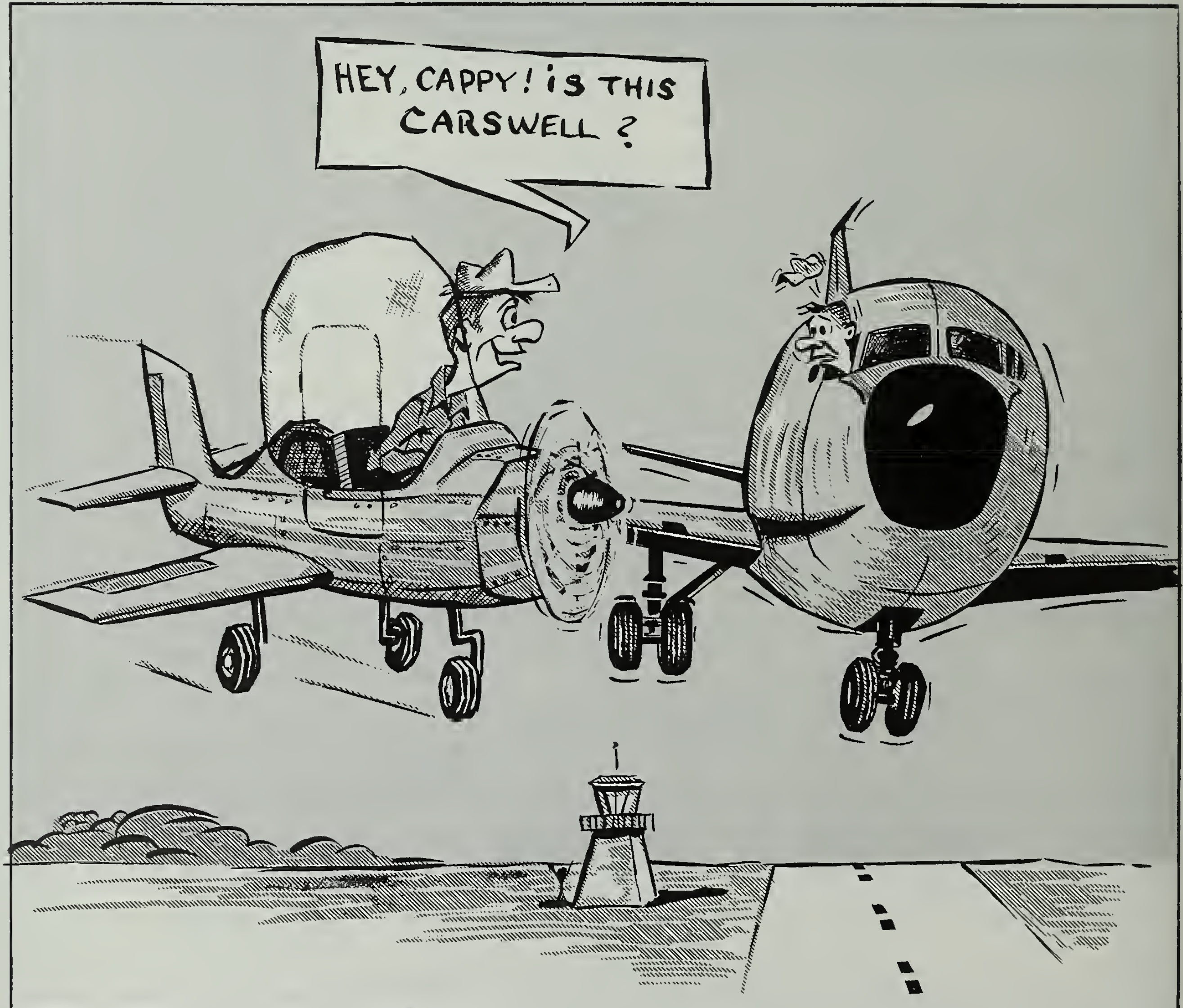
As you can see, the avionics system and the controls and displays are a highly technical and extremely important aspect in the design of the B-1. They must incorporate the best ideas and experience of the people who have been in the bombing, navigation and ECM business for years. Too often, in the past, non-flying, non-military engineers and systems designers have been responsible for making decisions concerning design and arrangement of avionics systems. Without inputs from experienced crew members who have performed the tasks for which the system is being designed, it naturally followed that designs were often less than optimum. Navigators, both offensive and defensive, have had to devise work-arounds for these system deficiencies, which have, in many instances, created additional task loadings. This can adversely affect an individual's performance, whether it be an EWO mission or routine RBS training activity. It is with this in mind that I would like to discuss what SAC is doing to insure the B-1 does not similarly suffer.

In order to insure that the B-1 avionics design will meet SAC's requirements, navigators have played a vital role from the beginning. They have been assigned managerial duties at HQ SAC to monitor and control the offensive and defensive avionics development and test programs. Navigators are also assigned to the B-1 System Program Office at Wright-Patterson AFB, Ohio, at the Boeing Company in Seattle and at the Rockwell plant in Los Angeles. At Edwards AFB, CA, SAC has a selectively manned crew who is sharing the B-1 test flight duties with the Air Force Systems Command (AFSC) test crew. (Major Fred Black, an "old" head, is the first SAC OSO and Major Peter E. Sfameni is the first SAC DSO.) As a result, the B-1 benefits from the training and experience of crews from both commands. Representation is provided at all avionics design reviews, conferences and meetings which require SAC inputs and positions. As a result of this participation, SAC has been able to pinpoint problems which were not identified on many previous aircraft until it was too late or too expensive to change. We will continue to operate in this manner until final design and testing is complete.

In summary, the B-1 will be the most sophisticated and capable bomber in the world. This is due, in large part, to the painstaking efforts of those responsible for selecting the best and most cost effective equipment to do the job and to the high experience and expertise of SAC navigators who have had a key role in the avionics design, development and flight testing. The end result of this effort is confidence. Confidence that the equipment selected, combined with the degree to which the operator can interface with it, is the best combination available for the B-1.

FLY-IN SAFETY SEMINAR

The increasing density of general aviation traffic makes it necessary to inform the flying public about military aircraft operations. A fly-in safety seminar used to increase personal contact between the military and the general aviation public is one of the most successful means to accomplish this.


HEY, CAPPY! IS THIS CARSWELL ?

Major Clete Singler
7BMW, Carswell AFB

Have you experienced any near-misses on low level recently or maybe in your own traffic pattern? In this day of many more civilian aircraft, the odds are we'll be seeing more general aviation aircraft in the skies that once were casually thought to belong to the military. However, the military rarely has exclusive rights to low level routes or airspace outside an Air Force base's magic five statute mile air traffic control area. So how do we go about impressing the ever increasing general aviation populace of our concern for their flying safety as well as for our own. One excellent method is a general aviation fly-in safety seminar like the one held at Carswell recently.

When preparing for a fly-in, plan ahead. In this case, planning and action began at least 60 days in advance to obtain a waiver to AFR 55-20, para 10A (2) and (3) as pertains to prior submission of AF Forms 181 (permit) and 203 (insurance). It will be necessary to have each fly-in pilot execute an AF Form 180 (hold harmless agreement). Once this initial step is undertaken the remainder is just ordinary staff work. Organize a working group for the commander with the safety representative as the chairman, write an operations plan to make it official, and do some leg work.

Here are some helpful hints from lessons learned at the Carswell fly-in. Civilian aviation groups are quite willing to help spread the word on local fly-in activities. They are also willing to assist in such tasks as parking airplances on the ramp. The Officer or NCO Club would probably be happy to provide a lunch at near cost. FAA General Aviation District Office accident prevention specialists are four-square for such events and probably would want to participate fully. Local TRACON and CENTER agencies are also very interested in accident prevention activities. Oh yes, even though local civilian aerial demonstrations would be crowd pleasers, they are highly discouraged by recent ALMAJCOM 0622/76.

For Carswell's big event, just a couple hours before the scheduled kickoff, a typical Texas thunderstorm lit up the sky and provided much needed rain which certainly didn't dampen the spirit of the event. The field opened at 0630 and eventually more than 50 civilian aircraft landed and parked on an unused taxiway. The civilian aviators were taken to the Officers Club for breakfast and free coffee, then to the base theater for the morning's activities which started with a welcome by Col David E. Blais, 7th Bomb Wing commander.

Approximately 200 aviation enthusiasts received briefings dealing with Carswell's mission, local air traffic control, general aviation safety and the collision potential between military and civilian aircraft in the local area. Speaking at the various presentations were representatives from the intelligence office who presented a Soviet Strategic Arms briefing; the accident prevention specialist from the FAA; controllers from DEW TRACON, and Carswell Tower and GCA chiefs who briefed the local traffic pattern and local low level training routes.

One particularly well received item was a thorough briefing of NTSB-Aircraft Accident Report 75-10 between a T-29 and Cessna 150 over Newport News, Virginia, on January 9, 1975. Sufficient copies of the report were available from the General Aviation District Office for each individual attending.

After the morning briefings, a western style barbecue lunch was served on the flightline by the NCO Club. Subsequently the program provided tours of the simulators, continuous FAA safety films, a preflight contest on two light aircraft provided by the local flying club. In addition, an open question and answer period was held with FAA General Aviation District Office, TRACON and Carswell flying safety representatives. The 7th Security Police Squadron presented an interesting military police dog demonstration.

Static displays of civilian, antique and classic aircraft were on view throughout the day along with a B-52D and KC-135. The activities culminated with presentation of awards for the best antique and classic aircraft and first and second places in the preflight contest.

As mentioned in the required SACR 55-12 Accomplishment Report, the only desired improvement is greater participation through improved weather — and for those civilian pilots who sleep late Saturday morning, perhaps a little later arrival time block versus the schedule 0630 to 0830.

A great deal was accomplished with the person to person communication and the professional briefings by the experts. A fly-in safety seminar is an excellent way to accomplish flying safety and safety awareness in general; it is especially well received when performed in a highly professional manner.

OTSL TRAINING TOPICS

... A SYNOPSIS OF NEW PROGRAMS FOR SAC AIRCREW TRAINING

Recently, OTSL produced several programs of interest to SAC crewmembers. The majority of these were developed and produced over a period of several months. But whenever a subject draws a great deal of command interest, production activities are compressed and the program is completed in a much shorter period of time. Such is the case with two of our latest videotapes: "Command Control" and "SAC Goes Red Flag." The command determined that the information contained in these programs warranted immediate dissemination to you in the field.

Here are the most recent videotapes from our television studio. (Programs are unclassified unless otherwise so stated.)

Command Control — This program is classified SECRET and contains information sensitive to the execution process. As such, CINCSAC/DOC has restricted viewing of this videotape to those personnel having a need-to-know concerning SIOP execution procedures. It is mandatory viewing for all SAC missile and aircrew members and unit command post personnel charged with the execution of the SIOP.

This videotape is also to be used for indoctrination and orientation training at the CCTS level. The program is designed to show how SAC functions as part of the worldwide military command control system in response to a hypothetical Soviet missile attack. It depicts:

1) NORAD detection and relay of missile warning data to the National Military Command Center.

2) Actions at the national level which lead to the National Command Authority decision to execute the SIOP.

3) SAC actions including posture change, positive control launch, and dissemination of the execution message to the crews.

SAC Goes Red Flag — A SECRET program that discusses SAC's participation in Red Flag IV. It covers planning, the missions flown, a review of the results and lessons learned, and SAC plans for future Red Flag exercises. Check with current operations branch (DOTO) for more information concerning Red Flag exercises.

KC-135 Fuel System Review, Part V — Discusses safety aspects, aircraft preparation, checklist requirements, and emergency shutdown procedures for both single point and overwing refueling.

ASQ-38 Part IV: Automated Offset Unit-An Introduction — Provides a brief background on the operation and capabilities of the AOU. Selected error conditions and recovery procedures are demonstrated.

ASQ-48 Bombing Navigation System, Part II: Advanced Procedures — This program demonstrates advanced Q-48 operation. It discusses equipment checks, the heading system, synchronous and alternate bombing problems, and some subsystems.

Fighter Aircraft Recognition — A SECRET program that emphasizes the prominent recognition features of enemy interceptor and tactical fighter aircraft. This is the third part of a three part program. Parts I and II, to be done on sound/slide, deal with enemy weapon system capabilities and geographic locations.

MITO Procedures — This program takes you from preflight through MITO taxi, takeoff, departure. This too is the third part of a three part program. Parts I and II, coming out soon on sound/slide, deal with mission planning and the pre-takeoff meeting.

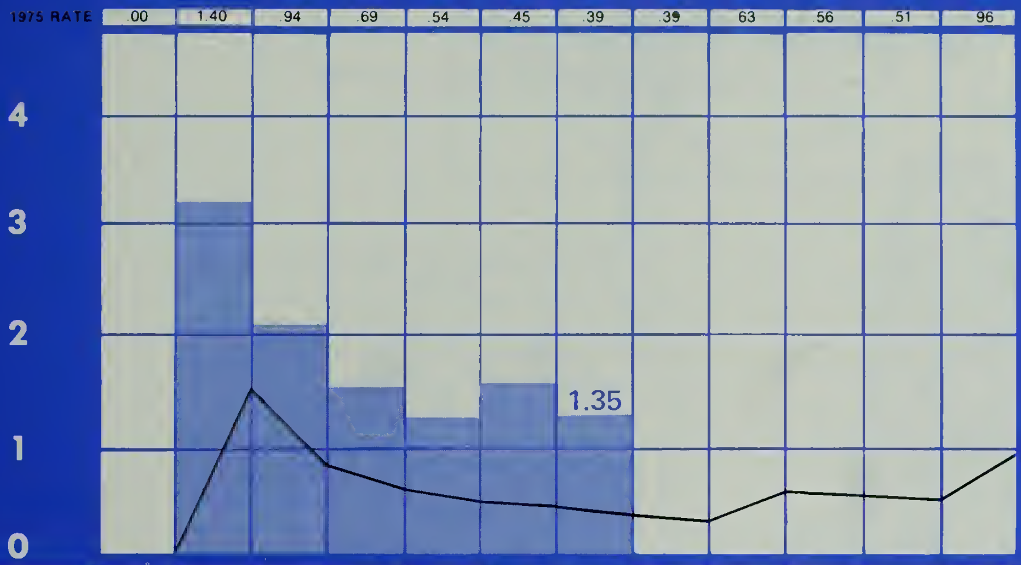
Several shows currently in production would be of interest to you. *SAC Simulation Briefing* discusses the present and future role of simulators in SAC. *Soviet Strategic Forces* will update you on the latest offensive and defensive capabilities of the Soviets. All volumes of SAC Tactical Doctrine are planned to be available for crew study prior to the implementation date.

Several sound/slide programs are being completed that should be of great value. A much needed program on NAV TERPS will be forthcoming in three parts. There's also a program on *KC-135 EWO Takeoff Data Computations.*

Remember, our phone numbers in the OTSL catalogue. If we can be of assistance to you or you have some ideas, call us. We're here to provide training support for you.

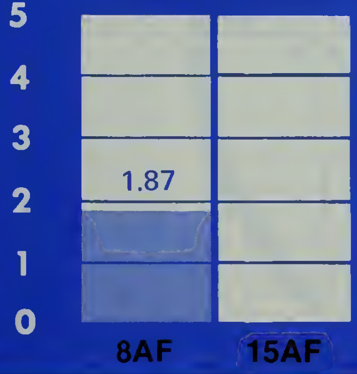
1976 Flying Safety Rate

SAC MAJOR ACCIDENT RATE (PER 100,000 FLYING HRS)



ACCIDENTS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1975	0	1	0	0	0	0	0	0	1	0	0	2
1976	0	2	0	0	0	1	0					

1976 SUBORDINATE CMD RATES

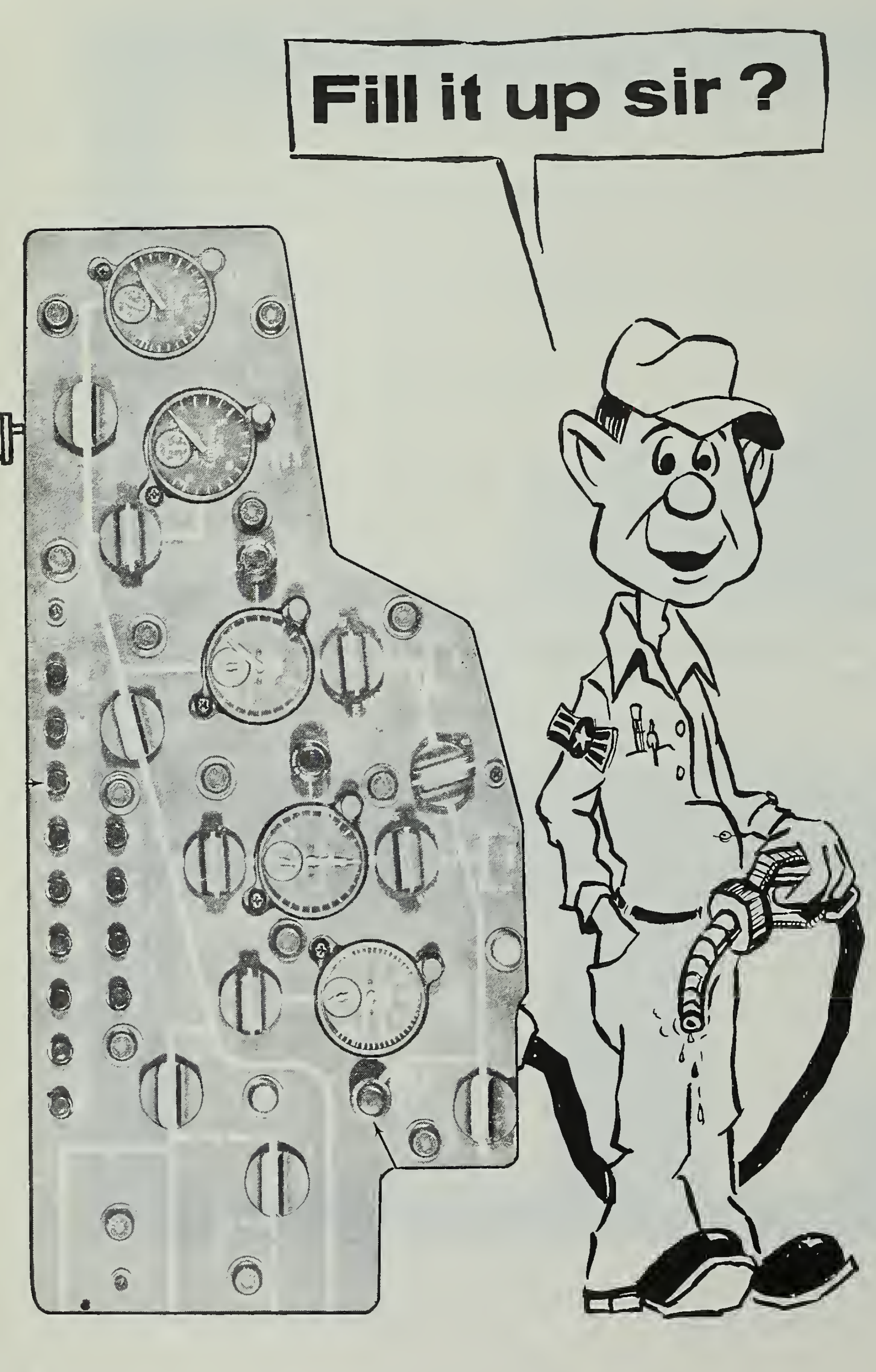


ACCIDENT STATUS

KC-135	FEB 76
FB-111	FEB 76
FB-111	JUN 76

LEGEND ⌃ =1975 RATE

OPS HAZAR

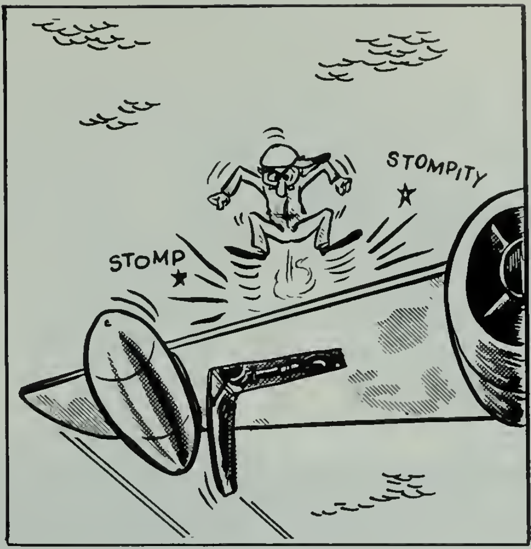

Fill it up sir ?

FUEL PANEL AGAIN!

The B-52 mission was planned and flown as a normal training mission except that the low level portion was canceled due to weather and the crew returned to home station for transition. The first approach was flown to a missed approach at a gross weight of approximately 270,000 pounds which included about 90,000 pounds of fuel. Three additional approaches and missed approaches followed. The fuel panel setting during this period had been 1, 2, 3, 4 on, 13 through 16 closed, and 9 through 12 closed because the fuel in 1 and 4 was above the green band area.

Following the fourth missed approach just after rollout on down wind, number seven engine flamed out followed by number eight about five seconds later. The copilot stated that fuel in one and four at the time of the flameout was approximately 5-6000 pounds. He immediately

DS



opened valves 9 through 12 and started transferring outboard fuel into one and four. The crew declared an emergency, and after making several unsuccessful restart attempts, accomplished an uneventful six-engine landing.

Prior to the fourth approach and missed approach, the copilot stated that fuel in one and four was slightly above the green band range, therefore valves 9 through 12 remained closed. It is felt that due to the copilot flying the approach he made a quick check of the fuel panel, possibly in a turn or just after roll out, when the fuel gauges tend to fluctuate over a several thousand pound range. Under these conditions, there was probably less fuel than was indicated. Careful monitoring of the fuel panel during transition is essential.

All crews should be aware of the potential for and danger of engine flameout during a touch-and-go or taxi backing landing. Just a few years ago, a B-52 was destroyed and several lives lost for this very reason. Are you prepared to handle a problem like this?

GEAR UP OR DOWN? —

On initial takeoff, the right tip gear indication of a B-52 was down and locked after gear retraction. The gear was recycled in accordance with Section III of the Dash One with the tip gear still indicating down and no light in the gear handle. Command post was notified and the mission continued. During air refueling, the boom operator on the tanker aircraft reported the right tip gear up and locked. The remainder of the mission was flown as scheduled.

On the initial penetration back in the local area, a throttle was retarded to activate the gear warning horn as the landing gear was lowered. The warning horn sounded as the gear came down. All gear indicated down and locked and the warning light in the gear handle went out. The landing was made with an estimated four-knot crosswind component from the left. This caused the aircraft to heel over to the right. The heel over was much greater than normal under the existing conditions of light wind and with fuel balanced across the wings. Immediate fuel transfer was started from the right wing to the left wing.

The supervisor of flying was called immediately and he reported the right tip gear was still full up. With fuel being transferred from the right to the left wing, the aircraft started to heel over to the left, raising the right wing well above the runway. The right tip gear was then lowered by the emergency gear extension system. The aircraft was taxied back to parking without further incident. The right tip gear was cycled for maintenance twice in the parking stub with the malfunction occurring in each instance.

Maintenance investigation revealed that TCTO 1B-52-2160 was completed on the tip gear. The system's indication was adjusted and the operational check was okay. During additional maintenance, it became necessary to remove the right tip gear switch box assembly from the strut. Switch activating cam P/N 3-74482-2 was removed from the box assembly and after inspection reinstalled. Switch adjustment was not disturbed and switch actuator screws remained safety wired. In the process of installation, the actuating cam was installed in reverse which caused the down lock and down lock indicating switches to remain actuated at all times. The instruments indicated a safe down and locked condition. After takeoff the gear retracted normally; however, it indicated down and locked throughout the flight. Normal extenstion of the gear was not successful due to the down lock switch being actuated and normal gear down electrical circuitry open.

PROFESSIONAL PERFORMERS

Crew R-12, 43d Strategic Wing, Andersen AFB: (left to right) EWO Capt Robert B. Carrier, P Capt Merlin E. Christensen, RN Capt Harold A. Smith, N 2Lt Henry Childs, G TSgt Leonard E. Griswold, CP 1Lt Regner C. Rider, IP Capt Robert S. Nager.

Individuals selected for these pages as SAC's top professional performers of the month are chosen from nominations made by all SAC units. Selection is made only after all nominations have been carefully screened and those chosen meet the highest standards of excellence as outlined in SACM 127-2.

MAINTENANCE MAN Sergeant Gary E. Graves, 93 Bombardment Wing, Castle Air Force Base.

MINUTEMAN Crew R-095, 91 SMW, Minot AFB: MCCC Capt David M. Stuart, DMCCC 1Lt Lonnie D. Crawford.

TITAN Crew E-054, 308 SMW, Little Rock AFB: MCCC Capt Steven A. Bienstock, DMCCC 1Lt John D. Gilliam, MSAT Sgt Steven E. Black, and MFT Sgt Rafael D. D. Quezada.

HALL OF FAME

TACTICAL FLYING

OVER SIXTEEN YEARS

916 AREFS, Travis	Sept '59
97 BMW, Blytheville	Mar '60

OVER FIFTEEN YEARS

410 BMW, K.I. Sawyer	Oct '60
19 BMW, Robins	Oct '60

OVER FOURTEEN YEARS

11 AREFS, Altus	Feb '62
301 AREFW, Rickenbacker	Jul '62
96 BMW, Dyess	Aug '62
449 BMW, Kincheloe	Aug '62

OVER ELEVEN YEARS

320 BMW, Mather	Jul '65

OVER NINE YEARS

92 BMW, Fairchild	Feb '67
55 SRW, Offutt	Jul '67
2 BMW, Barksdale	Aug '67

OVER EIGHT YEARS

319 BMW, Grand Forks	Dec '67
22 BMW, March	Feb '68

OVER SEVEN YEARS

5 BMW, Minot	Feb '69

OVER SIX YEARS

42 BMW, Loring	Oct '69
93 BMW, Castle	Nov '69
28 BMW, Ellsworth	May '70

OVER FOUR YEARS

7 BMW, Carswell	Mar '72
416 BMW, Griffiss	May '72

ICBM

OVER TWELVE YEARS

381 SMW, McConnell	Nov '63
90 SMW, F.E. Warren	July '64

OVER ELEVEN YEARS

1 STRAD, Vandenberg	Sep '64
308 SMW, Little Rock	Aug '65

OVER FOUR YEARS

321 SMW, Grand Forks	Aug '72

To gain listing in the Hall of Fame, a SAC unit must be accident-free for 48 months.

SAFETY SCREEN

7BMW, Carswell Crew R-72: P Capt James E. Laney, CP 1Lt John R Wayner, RN Capt Henry Flores, N 1Lt Rodney M Bond, EWO 1Lt James W Logan, G TSgt James E Stradley

11AREFS, Altus Crew S-104: IP Capt James G Dickensheets, CP 1Lt Roy D Myers, IN Capt George L Burrus, IS TSgt Donald R Flax

449BMW, Kincheloe Crew R-117: P Capt Robert L Glaze, CP 2Lt Daniel J Beveridge, N 1Lt Dwain E Crane, BO SSgt Charles W Bogda Jr

2BMW, Barksdale Crew R-57: P Capt Billy F Richey, CP 1Lt Roger A Morrison, RN Capt Jimmy L Cowart, N 1Lt Lewis H Dendy, EWO Capt Byron N Vermillion, G SSgt Phillip Mayer

6SW Eielson Crew R-05: P Capt G A Milligan, CP 1Lt K E Trammel, IN Capt R D Flickenger, NN Capt R R Reinhard

28BMW, Ellsworth Crew E-116: P Capt Douglas L Theobald, CP 1Lt Daniel B Foor, NN 1Lt Kenneth A Souminen, BO SSgt Richard L Groat

17BMW, Beale Crew R-173: P 1Lt Walter J Morris, CP 1Lt Edwin G Markle, NN 1Lt Denneth R Volk Jr, BO Sgt Donald L Houchin

319BMW, Grand Forks Crew R-129: P Capt Michael J Moe, CP Capt Walter H Young, NN Maj Thomas R Adams, BO Sgt Steven P Fleming

93BMW, Castle Crew IT-93: IP Capt Sherwood S Abbott, IN Capt Ronald G Tackett, IS MSgt Jimmy W Connell

44SMW, Ellsworth Crew E-157: MCCC Capt James L Perrine, DMCCC 2Lt David T Lane II

90SMW, F E Warren Crew R-137: MCCC 1Lt Michael T Latham, DMCCC 2Lt William E Wimpee

321SMW, Grand Forks Crew E-100: MCCC Capt Richard T Knight, DMCCC 2Lt Robert H Lamontagne

381SMW, McConnell Crew E-015: MCCC Capt Jack A Riess Jr, DMCCC 2Lt John C H Ware, MSAT Sgt Gerald F Benjamin, MFT Sgt Ronald L Wiley

390SMW, Davis-Monthan Crew R-159: MCCC 1Lt Richard I Moore, DMCCC 2Lt George E McCary, MSAT A1C Kenneth J. Kraus, MFT Sgt James F Paulus

The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system /AW SACR 127-2.

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HEY. . .

You — the reader, the crewmember, the maintenance specialist, the commander or supervisor — by your contributions make Combat Crew magazine. Of course, some technical material comes from equipment manufacturers, or from specialists in a particular field. Still, the best articles will always be from where it's happening — in the field — and by those that make it happen you — the readers!

Of all human factors none is more important than the esteem in which a man holds his job. Crewing and maintaining strategic weapons systems are interesting, challenging jobs that place critical demands and heavy responsibilities on individuals of all ranks and specialties. When an article reflects this attitude, its reader appeal cannot help but be enhanced. As an author, you are most convincing and effective when writing about a subject you know well. The best and most interesting articles often document a personal experience. You don't have to be a Hemingway to make a worthwhile contribution. Presentation of a vivid personal experience will carry your story. The staff of Combat Crew magazine will apply a bit of editorial polish. Don't hesitate to include personal details or local color that promote the reader's feeling of being there. Details such as what you saw, what you heard, or what thoughts ran through your mind at a critical moment, make a story more believable and easier for the reader to identify with.

Pictures are important in the dissemination of information — particularly in a magazine. Obtaining effective photographs is largely a matter of knowing what you want and going after it. Decide what you want to show and prebrief the subjects as well as the photographer. When people are involved, have them doing something that will make the shot look natural. Use black and white film.

Combat Crew magazine is an important part of the Strategic Air Command image. You, your equipment, your unit, and your mission are all part of that image and we want to hear from you!